

Exhibit B

8/25/05

FCE

T. Smith

Make Head 1103

Tilt Sensor Assy #4

Upper Tilt Sensor CCA #4

Remove L1, L2 = ferrite beads

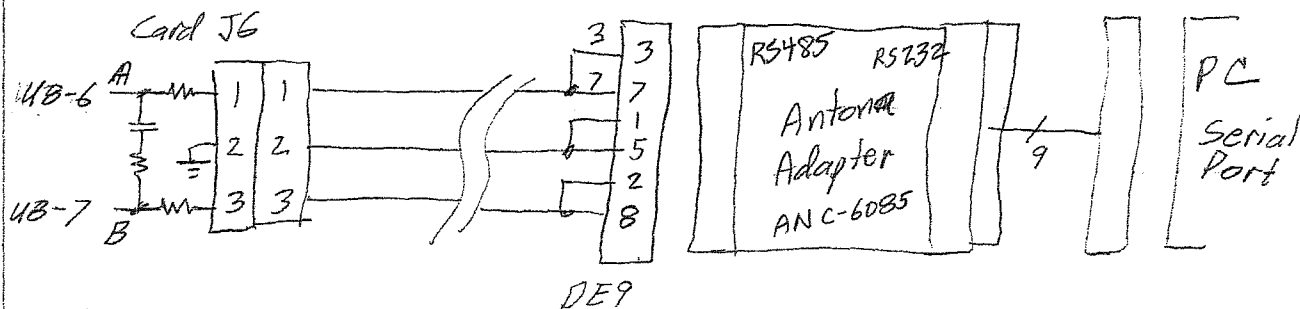
at J6 for RS-422 serial I/O

Install R = 100 ohm at L1 and L2

Sunday 8/28/05

Connect power and laptop PC and TS-GUI-33
to Tilt Sensor Assy #4.

For Serial I/O conn

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TOTAL RESISTANCE				ELECTRICAL/MECHANICAL TOLERANCE				UN./CONF. TOLERANCE	FUNCTIONS	REVISIONS		
NOMINAL	TOL.	MIN.	MAX.	ELECTRICAL	TOL.	MECHANICAL	TOL.			REV	E.C.O. No.	DATE
5000	±10%	4500	5500	150°		CONT.	-	±0.5%	INDEPENDENT LINEARITY	A	RELEASED	12/24/03

NOTES:

1. TRIM RADIUS: .456 MIN.
2. INSULATION RESISTANCE: 100 MEGOHMS MIN. BETWEEN ALL LEADS AND COND. SURFACE ADJACENT TO BACKSIDE
3. DIELECTRIC STRENGTH: 1000 VRMS BETWEEN ALL LEADS AND COND. SURFACE ADJACENT TO BACKSIDE
4. OUTPUT SMOOTHNESS: 0.1% MAX.
5. RESISTANCE TEMP. COEFFICIENT: 400 PPM/°C
6. POWER RATING: 1 W @ 70° C DERATED TO 0 W AT 125° C
7. OPERATING TEMPERATURE: -65° C TO +125° C

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USED WITH:

DESCRIPTION	PART NUMBER	QTY
ROTOR ASSEMBLY	6915-0000-060	1
INSULATOR	7040-0002-020	1

CUSTOMER:	EDGE INOVATIONS	
CUSTOMER DRAWING/REV	NONE	
CUSTOMER SPEC./REV.	NONE	

PROPRIETARY AND CONFIDENTIAL

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DIMENSIONS ARE IN INCHES		NAME		DATE	
TOLERANCES:		DRAWN	J. CERRONA	12/03/03	
FRACTIONAL ±		CHECKED	R. PRIVITT	12/24/03	
ANGULAR: MACH ±2° BEND ±		ENG APPR.	R. PRIVITT	12/24/03	
TWO PLACE DECIMAL ±.01		MFG APPR.			
THREE PLACE DECIMAL ±.005		Q.A.			

MATERIAL		NOTED	
FINISH <td colspan="2">NOTED</td>		NOTED	
DO NOT SCALE DRAWING <td colspan="2"></td>			

Information in this box is for Engineering Reference Only

JDK CONTROLS, INC.			
GRASS VALLEY, CALIFORNIA			
ELEMENT ASSEMBLY			
SIZE	CAGE CODE	DWG. NO.	
A	5W885	6915-2120-070	
SHEET 1 OF 1			

ATTORNEYS EYES ONLY

MAR-12-04 FRI 12:54 PM JDKCONTROL

FAX NO. 530 273 0769

P. 02

c:\fce\jordankleinsr\makohead\fce030d\schematic\fce030d.bom

1: SCHEMATIC, TILT SENSOR LOWER CCA Revised: Saturday, January 17, 2004

2: FCE030C-SCH-0 Revision: -

3:

4: FERN CREEK ELECTRONICS INC.

5: ORLANDO, FLORIDA

6:

7:

8:

9:

10: Bill Of Materials January 17,2004 13:00:44 Page1

11:

12: Item Quantity Reference Part PCB Footprint

13:

14:

15: 1 1 C1 10 UF/ 50V CAP/AE_SM_D_12

16: 2 1 C2 0.1 UF/ 50V SM/C_1206

17: 3 1 C3 47uF/25V CAP/AE_SM_D_12

18: 4 1 C4 100uF/25V CAP/AE_SM_D_12

19: 5 2 C13 0.1 UF SM/C_0805

20: C5 0.1 UF SM/C_0805

21: 6 2 C9 1.0 UF/16V SM/C_1206

22: C6 1.0 UF/16V SM/C_1206

23: 7 1 C7 1.0UF/16V SM/C_0805

24: 8 1 C8 1.0 UF/16V CAP/AE_SM_D_12

25: 9 3 C10 3.3UF/25V CAP/AE_SM_D_12

26: C11 3.3UF/25V CAP/AE_SM_D_12

27: C12 3.3UF/25V CAP/AE_SM_D_12

28: 10 3 C13 0.1UF

29: C51 0.1UF

30: C52 0.1UF

31: 11 1 C50 0.1UF SM/C_1206

32: 12 1 D1 S1B SMAJ

33: 13 1 D2 MA2J113 SM/R_0805

34: 14 5 E1 TERMINAL TP1

35: E2 TERMINAL TP1

36: E3 TERMINAL TP1

37: E4 TERMINAL TP1

38: E5 TERMINAL TP1

39: 15 8 H1 MTHOLE125 MTHOLE125

40: H2 MTHOLE125 MTHOLE125

41: H3 MTHOLE125 MTHOLE125

42: H4 MTHOLE125 MTHOLE125

43: H5 MTHOLE125 MTHOLE125

44: H6 MTHOLE125 MTHOLE125

45: H7 MTHOLE125 MTHOLE125

46: H8 MTHOLE125 MTHOLE125

47: 16 2 H10 MTHOLE040 MTHOLE040

48: H9 MTHOLE040 MTHOLE040

49: 17 1 J1 CON10 BLKCON.100/VH/TM1SQ/W.100/10

50: 18 1 R1 RXE020 AX/.600x.100/.034

51: 19 5 R2 1.00K SM/R_0805

52: R4 1.00K SM/R_0805

53: R7 1.00K SM/R_0805

54: R11 1.00K SM/R_0805

55: R17 1.00K SM/R_0805

56: 20 2 R5 10.0K SM/R_1206

57: R3 10.0K SM/R_1206

58: 21 1 R6 2.26K SM/R_0805

59: 22 2 R21 HZ0805 SM/R_0805

60: R8 HZ0805 SM/R_0805

61: 23 2 R22 NOT USED SM/R_0805

62: R9 NOT USED SM/R_0805

63: 24 8 R10 10.0K SM/R_0805

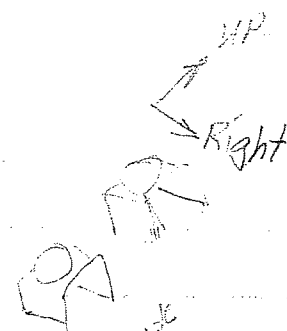
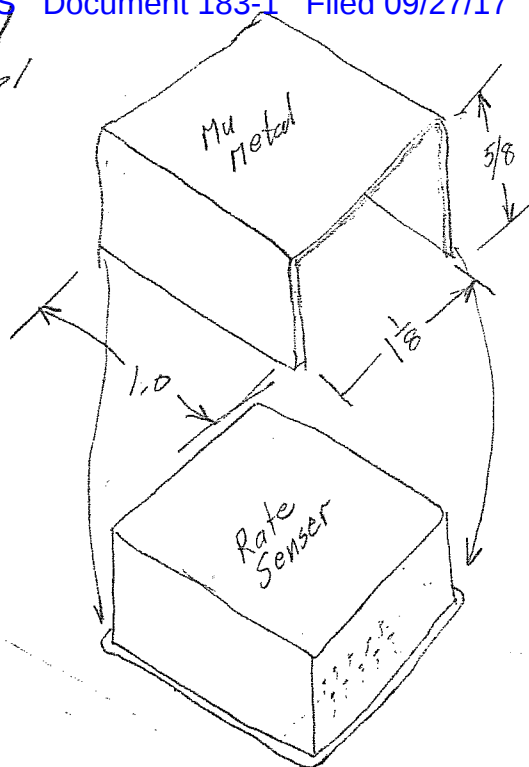
64: R12 10.0K SM/R_0805

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Magnetic Shield
for Motor Control
Rate Sensors

Wrap-Over Shield Piece

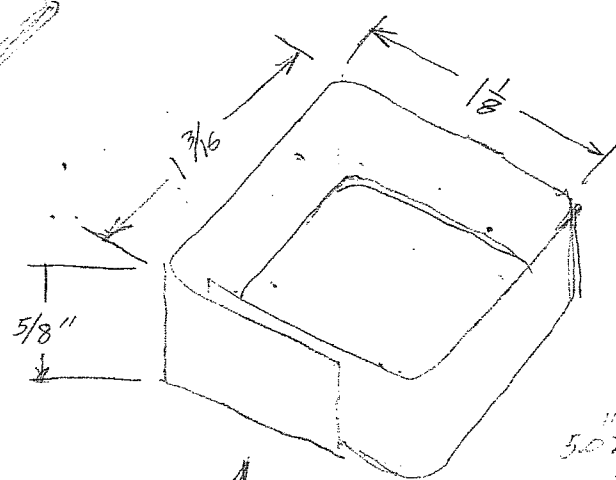
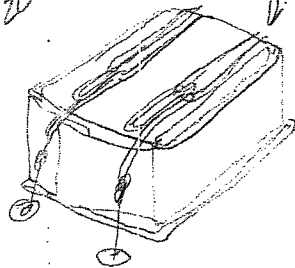
$2\frac{3}{8} \times 1.0$



M.C. Co.
Bent Steel Plate

★ Digital
photos

Double
Tie-Down
20' GA BUS WIRE



$1\frac{3}{16}$
 $1\frac{3}{16}$ \rightarrow $2\frac{3}{8}$
 $1\frac{1}{8}$
 $1\frac{1}{8}$ \rightarrow $2\frac{3}{8}$
 $\frac{3}{8}$ \rightarrow $\frac{3}{8}$
 $\underline{\hspace{1cm}}$
 5.0

$5.0 \times \frac{5}{8}$

Wrap-Around Shield Piece

Overlap $\frac{3}{8}$ "
on Lower Side
of Rate Sensor
(near bent-up lip of steel plate)

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EXHIBIT “E”

**HIGHLY
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C:\FCE\JordanKleinSr\MakoHead\Software\TiltSens_4X\Til_sens_40\TilSen40.c

```

/*-----
--
--                      Fern Creek Electronics Inc          PROJECT: tilt senso
--
--

```

```

--  FILENAME:  tilsen40.c          ( Was tilt_sensor.c )
--
--  AUTHOR   :  Tom Smith          ( Was Rich Reper until May 04)
--
--  DESCRIPTION :
--              Main routine for scheduling operations. --
--  Requirements:
--

```

*Printed
May 12, 2008
T.S.*

Need to select the accelerometers using the mux and get the duty cycle for each of four inputs (tiltx and tilty, orientation x(z) and orientation y using CCP2 pin B3 "fuses" command and or the mplab configuration bits can be used to configure the (use the secondary input pin. The rate sensor is sampled at 15 hz from the same int that drives the DAC. In the background the adjusted rate cmd will be accumulated and averaged. The serial interface runs from the background if needed as well as the r sensor filtering.

Need to do cal code
Need to mod serial interface for tilt sensor
Need to mod flash management code

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ONLY**

```

--

```

REVISION HISTORY

```

--
--  DATE          VER #      DESCRIPTION AND AUTHOR OF CHANGE
--
--  06/06/03      1.0        Reper created
--  06/07/03      1.1        Corrected timing for 18.4 and adapted demo code for mako
--  06/11/03      1.2        Figured out pinouts and tlv5625
--  06/19/03      1.3        Added code to support the AD input from pot and led
--  06/21/03      1.4        Added requirements and moving average
--  06/26/03      1.5        Corrected slope and rate problems. Added pulse on c1
--  06/27/03      1.6        Corrected 200 - 10khz wrong variable
--
--  -----baseline for the fce010 software -----
--  06/27/03      1.0        Created project based on mako software
--  06/29/03      1.1        Bug in > 0 and adjusted counts to get 10khz
--
--  Bug in table lookup and out of phase check
--  08/05/03      2.0        Improved stability of the 14 khz pulse by moving some
--                          processing out of the 200 hz int and into background
--  09/07/03      2.1        Added serial messaging and muxing of the AD interface
--  09/10/03      2.2        Added messages for rest of ad channels
--  09/17/03      2.3        Completed the nv writes to eeprom
--  10/04/03      2.4        Modified the int_2 routine and the averaging
--
--  -----baseline for the tilt_sensor software -----
--  09/30/03      1.0        New project
--  10/09/03      1.1        Change the read adc routine to read rate at 20 hz. Add
--                          the mux and ccp processing. Added the duty cycle calcs.
--  10/16/03      1.2        Add power on delay of 2 secs. Hard code offsets.
--  10/27/03      1.3        Changed code to use PAd then loaded with clock as EC
--  10/29/03      2.3        Added constants for tilt sensor #2 rev n.3 software
--  10/30/03      x.4        Add more filtering, expand angle from 5 to 10 degrees
--  11/08/03      x.5        Switched over to using CCP1 and CCP2. Freed much back
--                          time for processing serial messages. Got serial working.
--  11/12/03      x.6        Switched serial to interrupt driven. Added filter and s

```

```

C:\FCE\JordanKleinSr\MakoHead\Software\TiltSens_4X\Til_sens_40\TilSen40.c
// be delayed as much as the pulse width without any detrimental effects.

// sit here and read the pin looking for the signal to go low.
while (input(PIN_B3)) {
    get_serial_data();
    restart_wdt(); // set in the end of the background while loop also
}

fall = get_timer1();
set_timer1(0); // start counting for next cycle

if (skip++ > 0) {
    // synchronize to this waveform. skip the first occurrence and reset clock
    pulse_width = fall - rise; // CCP_1 is the time the pulse went high
    period = fall;
    percent = (float) pulse_width / (float) period;

#ifdef leds
    output_high(PIN_C0);
    if (inverted) output_high(PIN_B4); // flash the inverted led
#endif

    tmp_int = (signed int16)nv_coning;
    if (nv_coning > pan_rate_hyst)
        pan_rate_limit = (unsigned int16)(nv_coning - pan_rate_hyst);
    else
        pan_rate_limit = 1000;

    // disable the ccp while switching channels
    //disable_interrupts(INT_CCP2); // disable interrupt
    // switch channels
    switch (pwm_mode) {
    case tx :
        // adj_adc_val contains the latest update with gain and bias corrections
        // adj_adc_val goes from -512 to 512 and the cutoff is 0 +/- 100.
        if ((nv_coning != 0) && (adj_adc_val > tmp_int)) {
            pan_limiting = true;
        } else if (adj_adc_val < pan_rate_limit) {
            pan_limiting = false;
            tx_percent = percent;
            x = (percent - nv_txbias) / deg_per_percent; // tom's calc 218 us

            // request to decrease the update rate by 1/4
            time_to_store++;
            if ((time_to_store % 4) == 0) {
                tmpf = x - accel_bias;
                biased_x = (tmpf + pot1_adj); // accumulate

                // saturation limiting
                if (biased_x < -fl_again) biased_x = -fl_again;
                else if (biased_x > fl_again) biased_x = fl_again;
                // let a frame pass, then average

            } else if ((time_to_store % 4) == 2) {
                tiltx_sum += biased_x;
                /* will take 16 samples to settle to current value at 100 hz. 6.25 hz
                avg_tiltx = tiltx_sum / (float)nv_filter; // calc the avg
                tiltx_sum -= avg_tiltx; // remove the avg from the set
                duty_cycle[pwm_mode] = avg_tiltx;
            }
        }
    }
}

```

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```

C:\FCE\JordanKleinSr\MakoHead\Software\TiltSens_4X\Tilt_Sens_42\tilsen42.c
/*-----
--
--                      Fern Creek Electronics Inc          PROJECT: tilt sensor
--
--
--  FILENAME:  tilsen42.c      was  tilsen41.c
--
--  AUTHOR   :  Tom Smith      ( Was Rich Reper until May 04)
--
--  DESCRIPTION :
--              Main routine for scheduling operations. --
--  Requirements:
--

```

Need to select the accelerometers using the mux and get the duty cycle for each of four inputs (tiltx and tilty, orientation x(z) and orientation y using CCP2 pin B3 "fuses" command and or the mplab configuration bits can be used to configure the C use the secondary input pin. The rate sensor is sampled at 15 hz from the same int that drives the DAC. In the background the adjusted rate cmd will be accumulated and averaged. The serial interface runs from the background if needed as well as the sensor filtering.

Need to do cal code
Need to mod serial interface for tilt sensor
Need to mod flash management code

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```

--
--                      REVISION HISTORY
--
--  DATE          VER #      DESCRIPTION AND AUTHOR OF CHANGE
--
--  12 Jun 04      4.0        tilt_sensor.c copied over to tilsen40.c by T. Smith
--                          Add line to cause proper updating of NV checksum.
--                          No, the line missing in MC file is already here !
--                          T.Smith will revise text format in some places.
--
--  Aug.26,2005    4.1        Add lines for enable/disable USART receiver to
--                          avoid input buffer overrun error and subsequent
--                          hangup.
--                          ROM = 62k, RAM= 28k
--
--  Aug 27,2005    4.1        Merge 13 lines from tilt_sensor.h into this file.
--                          Continue cleaning up the text format, to my liking.
--
--  Aug 28,2005    4.1        Change rate_ref names to iga_pot names for uP input
--                          AN1 at pin 3. IGA = Inner Gimbal Angle wrt O.Gimbal
--                          Software works with schematic FCE036D-CCA with
--                          markups and with added schematic for hand-wired IGA
--                          circuit card, added to underside of '036 board.
--                          12:noon : this sw does run on TS Assy #4 and
--                          it talks to TS_GUI_33 and loads/displays NV values.
--
--  Aug.30,2005    4.1        Continue with notes, comments, and revisions.
--
--  Aug.31,2005    4.1        Several features work, but analog outputs not right.
--                          Debugging.
--                          Added (unsigned int16) in front of read_adc(...)
--                          in get_adc_output(). Fixed the problem.
--
--  Sep.1,2005     4.1        Continue text revisions, minor code revisions.
--
--  Mar. 5,2006    4.2        Change oscillator freq to 32.000 MHz. From 33.8688 MHz.
--                          Done because
--                          installed new osc on tilt sensor assy for M.Hd 1102.

```

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